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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/634,141

08/04/2003

Ilya V. Karpov

ITO.0554US (P16589)

5089

21906

7590

07/14/2005

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EXAMINER

LEE, EUGENE

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/634,141

Applicant(s)

KARPOV, ILYA V.

Examiner

Eugene Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4 and 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/25/05 has been entered.

Claim Objections

2. Claim 9 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 9 is already stated in claim 1.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4, and 8 thru 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang 6,545,287 B2 in view of Harshfield 6,117,720 in view of Hudgens et al. 6,507,061 B1. Chiang discloses (see, for example, FIG. 7) a phase-change memory cell comprising a pore 31,

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insulating layer (insulator) 14, sidewall spacer 24, heater 22, and phase change material 18.

Chiang does not disclose removing the upper portion of said heater to form a gap. However, Harshfield discloses (see, for example, FIG. 4 and 5) a memory cell comprising the steps of removing a plug 61 below at top surface 56. In column 4, lines 36-44, Harshfield discloses the plug is recessed below the top surface to form the base portion (heater) 42 and leave free the upper cavity portion 54. In FIG. 6, a chalcogenide material (phase change material) 45 is inserted into the upper cavity. It would have been obvious to one of ordinary skill in the art at the time of invention to remove the upper portion of said heater to form a gap in order to form a free cavity wherein a phase change material may be adequately deposited.

Chiang in view of Harshfield does not disclose patterning and etching said phase change material over said insulator. However, Hudgens discloses (see, for example, FIG. 1) a phase-change memory comprising a phase change material 22. In column 3, lines 25-27, Hudgens discloses the patterning and etching of the phase change material to form the phase-change memory. It would have been obvious to one of ordinary skill in the art at the time of invention to pattern and etch said phase change material over said insulator in order to remove any excess material in the phase change memory.

Regarding claim 4, see, for example, column 4, lines 28-33 wherein Harshfield discloses any excess material above the top surface 56 of dielectric volume 50 is removed by a mechanical planarization. It would have been obvious to one of ordinary skill in the art at the time of invention to planarize the upper surface of said insulator in order to keep the insulating layer flat and without any structural defects.

Regarding claim 8, see, for example, FIG. 7 wherein Chiang discloses the phase change material having a T-shape.

Regarding claim 9, see, for example, FIG. 7 wherein Chiang discloses a spacer 24 in the pore 31.

Regarding claim 10, see, for example, column 3, lines 53-55 wherein Chiang discloses the heater 22 being made of titanium nitride (metal). Chiang discloses (see, for example, FIG. 4, and 5) that the titanium nitride is deposited in the pore after forming the spacer 24.

Response to Arguments

4. Applicant's arguments with respect to claims 1, 4, and 8-10 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the applicant's argument on page 4 of amendment filed 5/25/05, Chiang clearly discloses (see, for example, FIG. 4, 5) the spacer 24 formed first which clearly extends the length of the pore, and then the metal heater 30.

Regarding the applicant's argument in the second paragraph of page 4, it appears the applicant's invention (Karpov) is assigned to Ovonyx, Inc., and the Chiang reference is assigned to Intel Corporation, two separate assignees.

INFORMATION ON HOW TO CONTACT THE USPTO

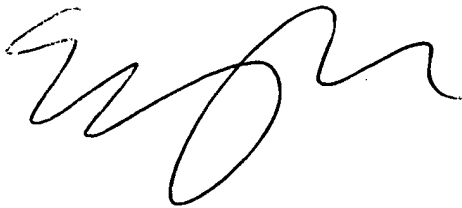
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee
July 7, 2005

A handwritten signature in black ink, appearing to be 'Eugene Lee', written in a cursive style.